Fish & Wildlife Division

RESOURCE STATUS AND ASSESSMENT BRANCH

Peregrine Falcon Surveys and Monitoring in the Parkland Region of Alberta, 2001

Alberta Species at Risk Report No. 34

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

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Rob Corrigan

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EXECUTIVE SUMMARY

Historically, the peregrine falcon (*Falco peregrinus anatum)* nested on cliffs along most major river systems in southern Alberta. Global declines of peregrine populations occurred during the 1950s and 1960s as a result of indiscriminate use of the pesticide DDT. By 1973, there were no known reproducing pairs of peregrines in southern Alberta. The species was listed as "endangered" in Canada in 1971, and in the United States in 1973. Following the banning of DDT and three decades of intensive management, populations of peregrine falcons are now recovering. The species is currently listed as "threatened" in Alberta, and in Canada as a whole.

The Parkland Region of Alberta supports a large percentage of the provincial population. During a survey in the summer of 2000, 12 territorial pairs were found in this region. Monitoring of this population continued in the summer of 2001. The goals of the monitoring were to: (1) determine nest site/territory occupancy of the 12 sites, (2) survey suitable habitat for new nesting and/or territorial pairs in the area, (3) determine breeding success and productivity of all nesting pairs, (4) identify the origin of all territorial peregrines through band readings, and (5) band young peregrines for future identification.

All 12 sites occupied in 2000 were also occupied in 2001. No new breeding sites were found. The occupied territories included seven sites on the Red Deer River, one in the North Saskatchewan River valley, two on generating stations (Genesee and Forestburg), and single pairs on Brazeau Reservoir and in the City of Red Deer. A pair of birds was present at all sites, with nine pairs initiating clutches ("breeding pairs"). Six pairs successfully produced a total of 20 young. Eleven of the 24 adult birds were of captive origin. Of 11 wild-born adults, four originated from sites along the Red Deer River, two were from urban sites (Calgary and Genesee), and five were of unknown origin. The origin (captive or wild) of two adults could not be determined. A total of 15 young were banded with a combination of black alpha-numeric bands and U.S. Fish and Wildlife Service bands in 2001.

Populations in the Parkland Region have increased from 1 pair in 1991 to 12 pairs in 2000 and 2001, although the rate of increase appears to be slowing. Production has increased to a maximum of 33 young (in 2000), and has averaged 1.65 young/territorial pair since 1991. Lower production in 2001 (20 young) compared to 2000 was due to the inclusion of new, inexperienced breeders to the population, the death of one adult, and the collapse of a nesting cliff.

It is recommended that standardized monitoring of breeding sites be continued on an annual basis in the Parkland Region. Continued searches for new nesting sites near occupied or historical nesting locations should also occur. This monitoring, along with similar efforts in other parts of Alberta, will allow wildlife managers to detect sudden declines in the population size or productivity of the small provincial population, and respond with necessary management actions.

1.0 INTRODUCTION

The peregrine falcon (*Falco peregrinus anatum*) historically nested on cliffs along most major river systems in Alberta. Nesting records indicate over 60 known eyries south of 56°N in Alberta (Court 1993a), but there are insufficient data to determine an accurate population estimate for the province. In the 1950s and 1960s, global populations of peregrine falcons declined due to reproductive failure resulting from accumulation of pesticide residues (DDT and its derivative, DDE) in tissues (Peakall *et al.* 1990, Court 1993b). By 1973, there were no known reproducing peregrine falcons in southern Alberta, and the species was considered to be extirpated in the region by 1975 (Fyfe *et al.* 1976), although small populations persisted on the Canadian shield area of northeastern Alberta. The peregrine falcon was listed as an "endangered" species in Canada in 1971 (COSEWIC 2000), and in the United States in 1973 (Milsap *et al.* 1998).

Following the near-extirpation of peregrine falcons in Alberta, and the banning of DDT in Canada in 1969, wildlife managers began intensive efforts to restore breeding populations. In the early 1970s, the Canadian Wildlife Service removed peregrines from remnant wild populations to establish a captive-breeding program to supply captive-raised peregrines for release into the wild once conditions were considered conducive for successful reproduction. Between 1976 and 1985, 131 captive-raised peregrines were released into southern Alberta through fostering and hack releases, with two pairs of adult peregrines successfully fledging young by 1986 (Murphy 1990). In 1992, it was found that pesticide residues in eggs collected between 1968 and 1992 had declined to the point where contamination should no longer inhibit reproductive success (Court 1993b). In that year, the *Southern Alberta Peregrine Falcon Reintroduction Project* began with the goal of releasing approximately 40 captive-raised peregrines annually through mass hack releases over a five-year period (Stepnisky 1996). This goal was subsequently achieved (Stepnisky 1996).

Since 1970, continent-wide censuses of peregrine falcons have been conducted every five years to monitor populations and gauge the success of management programs. In 1970, three occupied territories of peregrine falcons were found in Alberta, with just one of these being in the southern part of the province (Cade and Fyfe 1970). By 2000, the provincial population had rebounded to 48 pairs, with 23 occurring in southern Alberta (Corrigan 2000). The increasing population led to a down-listing of the species to "threatened" in Alberta in 2000 (ESCC 2000), following a similar down-listing at the national level in 1999 (COSEWIC 2000). However, populations are still at low levels, and regular monitoring and management is required if the species is to continue its population recovery.

In the 2000 survey, a total of 12 occupied territories were found in the Parkland Region[1] and adjacent Bow Region[1] of central Alberta (Corrigan 2000). In 2001, the Species at Risk Program of Alberta Sustainable Resource Development provided funding to

[1] For the purpose of this report, Parkland and Prairie Regions refer Alberta Government, Sustainable Resource Development administrative regions. See <www.gov.ab.ca/env/regions.html> for boundaries.

continue monitoring the peregrine falcon population in the this region. Specific objectives for 2001 were to:

1. Determine nest site/territory occupancy of the 12 sites,
2. Survey suitable habitat for new nesting and/or territorial pairs in the area,
3. Determine breeding success and productivity of all nesting pairs,
4. Identify the origin of all territorial peregrines through band readings, and
5. Band young peregrines for future identification.

2.0 METHODS

Specific terminology relating to the occupancy and success of nesting sites was taken from Murphy (1990), and is outlined in Table 1. This terminology has been consistently applied to provincial and national peregrine falcon surveys since 1985.

The twelve sites occupied in 2000 that formed the core of surveys conducted in 2001 included seven sites in the Red Deer River valley ("Fred's Place", "Twin Cliffs", "Silent Springs", "Ardley", "Trenville Park", "Tolman" and "Morrin"), two in the North Saskatchewan River Valley ("Rocky Mountain House" and "Brazeau") and three in urban areas or industrial sites ("Telus Tower", "Forestburg" and "Genesee"). To respect the sensitivity of these nesting sites, and to maintain landowner privacy, specific nesting locations are not provided in this report. Information and access to nest site locations can be provided to interested individuals at the discretion of the appropriate Alberta Fish and Wildlife Division staff.

Table 1. Survey and monitoring terminology and definitions (after Murphy 1990).

Term	Definition
Occupied Nest or Territory	• A nest site or territory that is occupied by at least one territorial adult during some part of the breeding season.
Breeding Pair	• A pair that laid at least one egg during the breeding season.
Productive Pair	• A pair that successfully raised at least one chick to an advanced stage of development from which the chick was assumed to have fledged. Chicks that reached an age suitable for banding are considered to be of advanced age.
Historical Nest Site	• Site that has been documented to have been occupied by breeding adults prior to the decline of the peregrine falcon population in southern Alberta, as identified by Court (1993 a).
Known Nest Site	• Site that has been documented to have been occupied by breeding adults in any prior year (includes historic sites plus new sites that have been occupied since the 1970s).

Initial occupancy checks on sites occupied in 2000 occurred between 2 and 26 May 2001. During this period, peregrines are actively courting and defending nesting territories and are relatively easy to detect, if present at a site. However, sites unoccupied on the initial visit were revisited up to three times to verify that the site remained unoccupied. All initial occupancy checks were conducted on foot by walking into historical nesting areas.

Surveys for new locations of territorial and/or nesting peregrines occurred between 2 May and 5 July. Survey effort was focused along the Red Deer River from the City of Red Deer to the Morrin Bridge (Highway 27) and along the North Saskatchewan River from Rocky Mountain House to Berrymore Ferry (Highway 759). Both of these river stretches have active peregrine nesting, as well as historical sites and numerous areas of suitable but unoccupied breeding habitat (see Johnstone 1999 for description). Particular emphasis was placed on searching historical sites, as recovering populations of peregrine falcons tend to re-establish at historical nest sites first (Cade and Fyfe 1970, Court 1993a). Surveys were completed by walking into known suitable nesting locations, or by surveying the river bank from a jet boat.

Regular monitoring of occupied sites occurred at approximately 10-14 day periods throughout the breeding season to determine the chronology and success of nests, and the identification of any banded birds. All monitoring was done from several hundred metres away (using 20-60x Bausch and Lomb Elite® spotting scope) to minimize disturbance to nests. Using this approach, specific nest contents could usually not be determined (unless large young could be seen), but the chronology of nests could be confirmed by observing incubating females, adults entering nest sites with food, or parental behavior that indicated the nest was still active. In cases where females were disturbed from a nest, the observer quickly retreated to a distance where birds were no longer agitated. Site visits to confirm hatching success (see Table 1 for definitions of nesting events) occurred between 8 and 12 June. If no young were observed and the female did not appear to be incubating, breeding was determined to have failed. At that point, any addled eggs were collected for laboratory analysis of pesticide residues, or to determine reasons for hatch failures. Visits to all active nests to determine fledging success occurred between 25 June and 7 July, although ongoing monitoring of active sites occurred until 31 July.

Young peregrine falcons were banded with a United States Fish and Wildlife (USFWS) aluminum band on the right leg (applied with pliers) and a colored (black) alpha-numeric band on the left leg (applied with rivets). The orientation of symbols on alpha-numeric bands was recorded (either horizontal [H] or vertical [V]) and whether there was a horizontal line separating the symbols (-). Banding was conducted under an Alberta Environment collection licence (015 CN) and research permit (3989 GP). Nests that contained less than four young were considered for fostering of captive raised young if ages were compatible.

At the conclusion of field surveys, all peregrine falcon nest site locations and occupancy, breeding and identification information was entered into the Biodiversity/Species Observation Database (BSOD), maintained by Alberta Fish and Wildlife Division. All

nest site and breeding information for prairie falcons (*Falco mexicanus*) and bald eagles (*Haliaeetus leucocephalus*) was also entered into BSOD.

3.0 RESULTS

During the 2001 breeding season, there were twelve occupied territories in the Parkland Region. These territories were the same locations that were held during the 2000 breeding season. A total of six days was spent surveying for new nest locations, with no new sites being located in 2001. Surveys for new nest sites were delayed by extremely low water levels, preventing the use of jet boats on the Red Deer and North Saskatchewan Rivers. All occupied sites were held by pairs of peregrine falcons, with breeding pairs occurring at nine sites (Table 2). Of the nine breeding pairs of peregrines, six pairs were productive and successfully fledged a total of 20 young. In 2001, the number of fledglings per occupied territories was 1.67 and the number of fledglings per breeding pairs was 2.22.

There were 24 adult peregrine falcons occupying territories in 2001, with 11 being identified as captive-born (denoted by red alpha-numeric bands), 11 as being wild-born (black bands or unbanded), and two as being of unknown origin (presence of bands not determined; Table 3). Of the 11 captive-born peregrines, 10 originated from hack releases of the *Southern Alberta Peregrine Falcon Reintroduction Project* between 1992 and 1996 (Stepnisky 1996) and one adult was introduced through fostering in 1999 at Fred's Place. Of the 11 wild-born peregrines, four originated from Red Deer River rural sites, two from urban sites (Calgary in 1998 and Genesee in 1999) and five were from unknown locations.

Table 2. Occupied territories, nesting success and productivity of peregrine falcons in the Parkland Region, 2001.

Site Name	Breeding Pair	Productive Pair	# of Fledged Young
Morrin	Yes	Yes	4
Tolman	Yes	Yes	2
Trenville Park	No	No	0
Ardley	Yes	Yes	3
Silent Springs	Yes	No	0
Twin Cliffs	Yes	Yes	4
Fred's Place	No	No	0
Telus Tower	Yes	Yes	4
Forestburg	Yes	Yes	3
Rocky Mountain House	No	No	0
Brazeau	Yes	No	0
Genesee	Yes	No	0

Table 3. Identification and origin of adult peregrine falcons occupying territories in the Parkland Region, 2001.

Site Name	Male			Female		
	Colored Band	USFWS Band	Origin	Colored Band	USWFS Band	Origin
Morrin	R 8K	816-81288	Morrin-93	B 9E (HV)	987-24480	Ardley-96
Tolman	R RW (VH)	816-81734	Morrin-94	B IG (HH)	987-24044	Haynes-98
Trenville Park	R HG (VH)	816-81913	Morrin-95	R 8B (VH)	1807-14089	Tolman-96
Ardley	R HW (VH)	816-81735	Ardley-94	R S2	987-86175	Bow City-92
Silent Springs	R XD (VH)	816-81792	Ardley-95	R 62 (HV)	1807-14059	Ardley-95
Twin Cliffs	*CV 01098	Unbanded	Fred's Place-99	Black	Unknown	Unknown
Fred's Place	B C/K (VH)	816-34119	Haynes-98	B 3M (HV)	1807-78722	Morrin-00
Telus Tower	Red	Unknown	Unknown	B I/K (HV)	987-24246	Calgary-98
Forestburg	R XK (VH)	816-81945	Haynes-96	B 2/H (HV)	987-24492	Genesee-99
Rocky Mtn House	Unbanded	Unbanded	N/A	Unbanded	Unbanded	N/A
Brazeau	Black	Unknown	Unknown	Black	Unknown	Unknown
Genesee	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

*CV 01098 is a seamless falconry band. This band was not removed from a foster chick at Fred's Place in 1999 for safety reasons and no colored band or USFW aluminum band was applied.

A total of 15 young were banded out of the 20 that successfully fledged during 2001 (Table 4). Young were not banded at Tolman due to the inaccessibility of the nest site, and at Ardley due to an extremely aggressive female that has struck Alberta Fish and Wildlife staff while banding young in previous years. Two young were known to have died after fledging. These include one young that was electrocuted at the Forestburg nest site and one young from Ardley that was found dead at the base of the nesting cliff. Banding occurred at Morrin and Twin Cliffs on 26 June, Forestburg on 4 July and the Telus Tower in Red Deer on 9 July. Although five captive-raised young were available for fostering, no attempts were made to place these chicks into wild nests. At the time when these chicks were available (approximately three weeks of age), only the Morrin and Twin Cliffs nests were of similar age, and both already contained four young. No addled eggs were collected for pesticide analysis.

4.0 DISCUSSION

The 12 pairs of peregrine falcons found in the Parkland Region in 2001 is a dramatic increase from the one pair observed in 1991. However, results of annual censuses conducted in the region since 1991 (Figure 5) suggest that the rate of increase in sites occupied by territorial birds is slowing. This pattern is similar to that of other recovering populations when approaching the regional carrying capacity. However, it is unclear if

Table 4. Summary of peregrine falcon young banded in the Parkland Region, 2001.

Site Name	Alpha-numeric Band	USFWS Band	Comments
Morrin	B B/W (VH)	987-29824	Female
	B U/X (VH)	987-29811	Female
	B O/W (VV)	816-34140	Male
	B O/V (VV)	816-16799	Male
Tolman	Unbanded	Unbanded	2 young known to have fledged
	Unbanded	Unbanded	
Ardley	Unbanded	Unbanded	3 young known to have fledged, one young found dead
	Unbanded	Unbanded	
	Unbanded	Unbanded	
Twin Cliffs	B D/W (VH)	987-24302	Female
	B 2M (HV)	816-34123	Male
	B 2S (HV)	816-16796	Male
	B 5S (HV)	816-34122	Male
Telus Tower	B 2W (HV)	816-34139	Male
	B 29 (HV)	816-34138	Male
	B 49 (HV)	816-34137	Male
	B HW (VH)	987-29806	Female
Forestburg	B K0 (HV)	816-16798	Male; later found electrocuted
	B B/X (VH)	987-29820	Female
	B H/X (VH)	987-29822	Female

current peregrine populations are similar to what occurred historically in the region. The first provincial peregrine falcon survey occurred in 1970 (Cade and Fyfe 1970) as part of the initial North American survey. By this time populations of peregrines had already declined precipitously and the historical population of peregrine falcons in the Parkland Region prior to this decline is unknown. Therefore, ongoing monitoring and surveys of populations in this region are required to determine when the population has stabilized and whether the local carrying capacity has been reached.

With an increase in the number of territorial locations, an overall increase in total natural production has occurred. This production reached a maximum in 2000, when 33 young were produced. However, the total annual production has not always matched the number of territorial pairs present. For example, the number of occupied sites increased from one in 1991 to seven in 1997, but there was only one productive pair in each of those years, which produced between three and four chicks annually. During this period, the number of chicks produced averaged 1.51 per territorial pair (range of 0.57 in 1997 to 4.0 in 1991), with production in four of seven years being less than 1.5 young per pair. Poor productivity of fledged young in the early stages of the peregrine recovery in central Alberta may have been due to the inexperience of the breeding population.

Table 5. Occupancy and productivity of peregrine falcons in the Parkland Region, 1991-2001 (Alberta Fish and Wildlife Division, unpubl. data).

Reproductive Measure	Year										
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Occupied Sites / Territories	1	2	2	4	4	4	7	7	10	12	12
Breeding Pairs	1	1	1	2	3	2	6	7	8	10	9
Productive Pairs	1	1	1	1	1	1	1	4	7	10	6
Total Young	4	3	4	3	4	3	4	12	15	33	20
Young / Territorial Pair	4.00	1.50	2.00	0.75	1.00	0.75	0.57	1.71	1.50	2.75	1.67
Young / Breeding Pair	4.00	3.00	4.00	1.50	1.33	1.50	0.67	1.71	1.88	3.30	2.22

Between 1992-1996, 145 captive-raised peregrines were released into this region (Stepnisky 1996), and it is from these releases that the majority of the breeding population in the Parkland Region originated. With more experience in site selection and feeding young, the territorial pairs met with increasing success in fledging young. Since 1998, the number of occupied sites has increased from seven to 12, with the number of productive pairs varying between 4 and 10, and between 12 and 33 young being produced. The average number of young per territorial pair during this period was 1.91, with production meeting or exceeding 1.5 young per pair in all years (range of 1.5 in 1999 to 2.75 in 2000; Table 5). Overall, natural productivity in the Parkland region has averaged 1.65 young/territorial pair between 1991 and 2001.

Although the same number of sites (12) were occupied in both 2000 and 2001, total chick production was lower in 2001 (20) than in the previous year (33). This decrease may be attributed to a number of non-related factors. Three young successfully hatched at the Genesee site but all died at a young age prior to fledging. Two new adults occupied Fred's Place, including a one-year old female. Copulation was observed, but due to the age and inexperience of the two falcons they were not successful in laying eggs and raising young. At the Silent Springs site, the female was found dead on 25 June beside the nest bowl (which contained shattered eggshells) and it was subsequently determined she was killed by an avian predator. This particular female was breeding for the fifth consecutive season at this location and had successfully fledged young in three of the last four years. The failure to successfully raise young at the Trenville Park site may be attributed to the natural collapse of the only suitable nesting cavity located on this particular cliff. It is unknown why the Brazeau Reservoir location, a traditionally strong site for the production of young, failed to produce young in 2001. The Forestburg Reservoir site produced young for the first time after being occupied for the previous two breeding seasons by territorial peregrines.

The demographics of the breeding population have changed dramatically in southern Alberta since 1997. As expected, the percentage of naturally produced peregrines entering the breeding population continues to increase (Figure 1). Johnstone (1998) suggests that the presence of floaters (non-breeding adults) in a peregrine population

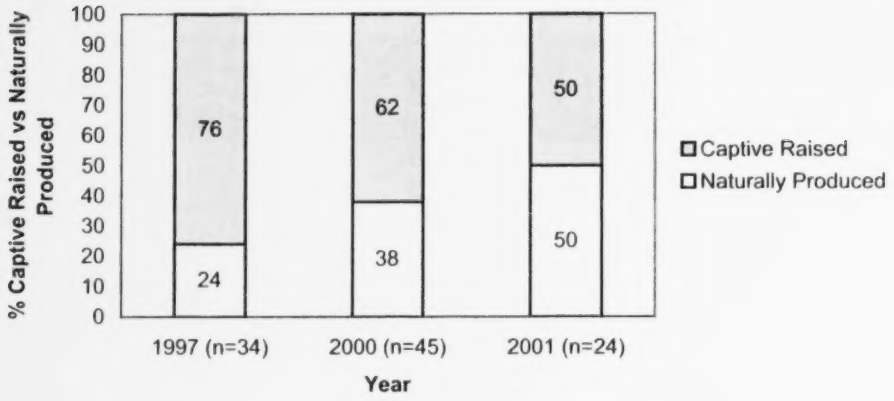

Figure 1. Percent of the adult peregrine falcon population that is captive raised and wild born, 1997, 2000 and 2001 (Alberta Fish and Wildlife Division, unpubl. data).

indicates competition for good quality or preferred nesting territories. Although, single adults held no territories in either the 2000 or 2001 breeding season, it is apparent that floaters exist for this population. In 2001, a minimum of four new adults held territories during the breeding season. Instead of unoccupied territories, there appears to be a presence of floaters that can enter the breeding population to supplement returning peregrines.

5.0 MANAGEMENT IMPLICATIONS AND FUTURE DIRECTIONS

Currently, the peregrine falcon is considered a "threatened" species, both provincially and nationally (ESCC 2000, COSEWIC 2000). In southern Alberta, the only locations where peregrine falcons have returned to their historic range and successfully and continually breed in a natural rural environment is in the Parkland Region. Successful breeding has only occurred since 1991 and at multiple sites since 1998. This population is still recovering and data collected to date should be considered the beginning of an ongoing monitoring program. All known sites are well documented and easily accessible and can be effectively monitored for occupancy and productivity. Continued monitoring will provide accurate estimates of carrying capacity and annual productivity, and is important for modeling recovering peregrine populations in the province (Court 1994, Stepnisky 1998). Inventories in the Parkland Region should incorporate a standardized protocol that would enable resource managers to evaluate the status of this species with minimal effort. Such standardized monitoring is now being developed for peregrine populations in northern Alberta. Ongoing monitoring of both the southern and northern Alberta populations would provide a warning should the productivity or population size of peregrine falcons suddenly decline in the province. Biologists could then undertake

more active management strategies, such as reinitiating hack releases or the fostering of chicks.

Future survey effort in the Parkland Region should continue to focus on the Red Deer and North Saskatchewan Rivers. The search for new nesting sites should concentrate on areas that provide high-quality breeding habitat in close proximity to either historical or active nest sites. Surveys can be completed efficiently and thoroughly by the use of jet boats on these two rivers and survey effort should be completed during the breeding season to detect occupied pairs. The Red Deer River can only be effectively surveyed by jet boat to the Morrin Bridge (Hwy 27), due to the width of the river valley and inaccessibility of suitable cliffs for viewing. Survey effort on the North Saskatchewan River should be focused between Rocky Mountain House and the Berrymore Ferry Bridge (Hwy 759).

6.0 LITERATURE CITED

Cade, T. J. and R. Fyfe. 1970. The North American peregrine survey, 1970. Can. Field-Naturalist. 84:231-245.

Corrigan, R. 2000. Survey of the peregrine falcon (*Falco peregrinus anatum*) in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Service, Alberta Species at Risk Report No. 2. Edmonton, AB. 17 pp.

COSEWIC. 2000. Canadian species at risk, November 2000. Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON. 24 pp.

Court, G. S. 1993a. A review of historical nesting records for the peregrine falcon (*Falco peregrinus anatum*) in Alberta south of 56° N: priorities for a recovering population. Unpubl. rept., Alberta Fish and Wildlife Division, Edmonton, AB. 65 pp.

Court, G. S. 1993b. A toxicological assessment of the American peregrine falcon (*Falco peregrinus anatum*) breeding in Alberta, Canada, 1968 to 1992. Unpubl.rept., Alberta Fish and Wildlife, Edmonton, AB. 28 pp.

Court, G. S. 1994. Population dynamics of American peregrine falcon (*Falco peregrinus anatum*) breeding in northeastern Alberta, Canada - 1971 to 1993: an evaluation of the need for continued management. Alberta Environmental Protection, Fish and Wildlife Services, Occasional Report Series No. 14. Edmonton, AB. 25 pp.

ESCC. 2000. First report of the Alberta Endangered Species Conservation Committee. Alberta Environment, Fisheries and Wildlife Management Division, Edmonton, AB. 24 pp.

Fyfe, R. W., S. A Temple, and T. J. Cade. 1976. The 1975 North American peregrine falcon survey. Can. Field-Naturalist 90: 228-273.

Johnstone, R. M. 1998. Aspects of the population biology of tundra peregrine falcons (*Falco peregrinus tundrius*). Ph. D. thesis, University of Saskatchewan, Saskatoon, SK. 130 pp.

Johnstone, R. M. 1999. Update of status report on the American peregrine falcon (*Falco peregrinus anatum*) in Canada. Submitted to the Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON. 44 pp.

Milsap, B. A., P. L. Kennedy, M. A. Byrd, G. S. Court, J. H. Enderson and R. N. Rosenfield. 1998. Review of the proposal to de-list the American peregrine falcon. Wildlife Society Bulletin 26: 522-538.

Murphy, J. E. 1990. The 1985-86 Canadian peregrine falcon, *Falco peregrinus*, survey. Can. Field-Naturalist 104:182-192.

Peakall, D. B., D. G. Noble, J. E. Elliot, J. D. Somers and G. Erickson. 1990. Environmental contaminants in Canadian peregrine falcons, *Falco peregrinus*: a toxicological assessment. Can. Field-Naturalist 104:244-254.

Stepnisky, D. P. 1996. The Southern Alberta Peregrine Falcon Reintroduction Project (1992-1996): summary and evaluation. Alberta Environment, Wildlife Management Division, Edmonton, AB. 42 pp.

Stepnisky, D. P. 1998. Demographic features of the recovering peregrine falcon population (*Falco peregrinus anatum*) in southern Alberta: 1980-1997. Alberta Environmental Protection, Natural Resources Service, Occasional Report Series Number 15. Edmonton, AB. 27 pp.

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